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Staka

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[54] **VOLLEYBALL TRAINING AND MONITORING APPARATUS**

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[51] **Int. Cl.**[5] **A69B 69/00**

[52] **U.S. Cl.** ..... **273/411**; 273/58 C; 273/413

[58] **Field of Search** ..... 273/411, 413, 58 C

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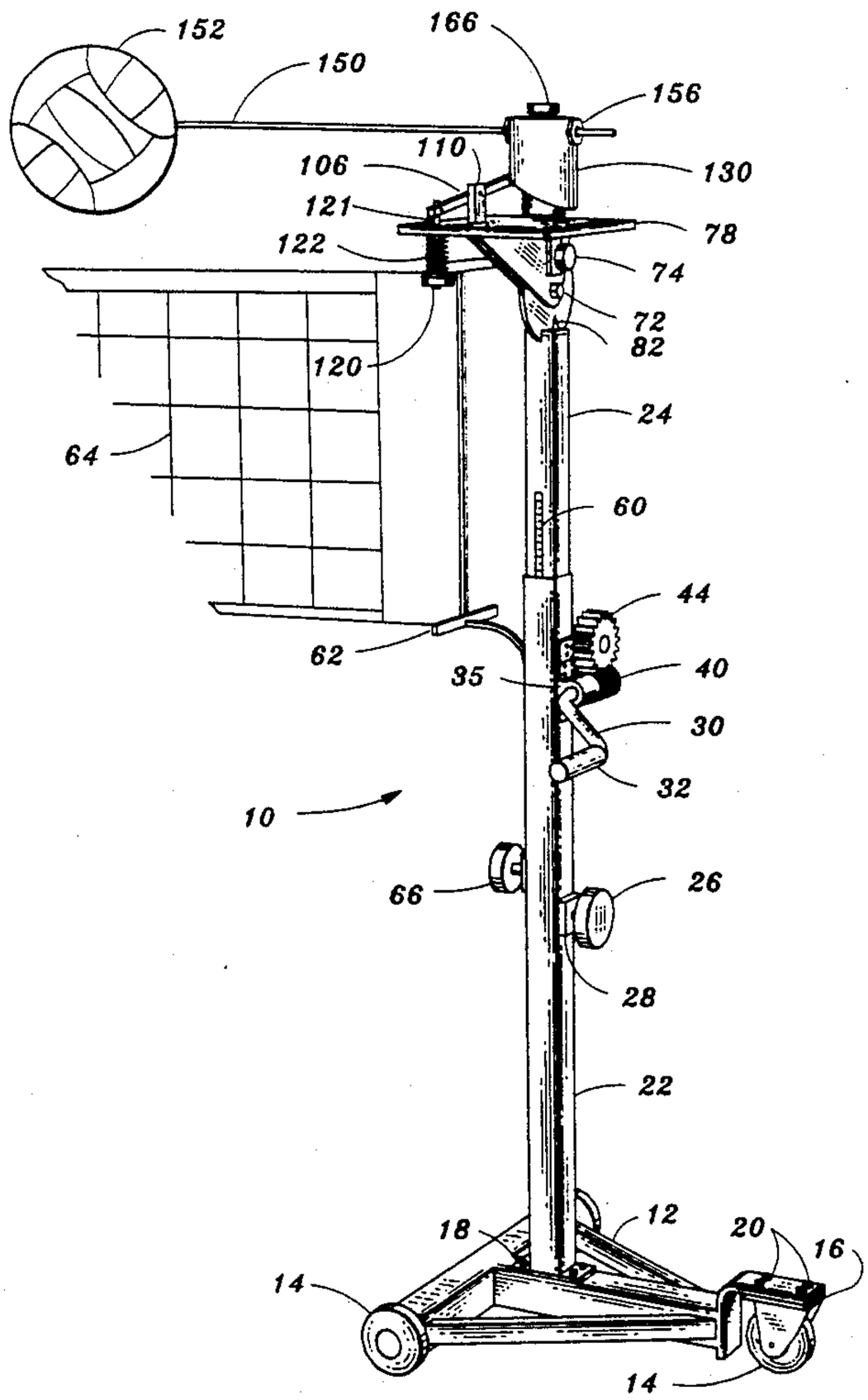
Primary Examiner—William H. Grieb
Attorney, Agent, or Firm—Jeffrey A. Hall

[57] **ABSTRACT**

A volleyball training and monitoring apparatus comprising a base and an upright support member connected to the base and extending upward from the base. The upright support member has an inner member slideably secured therein and extendably adjustable by a handle secured to a notched element operably engaged to a gear housing a sprocket engaged with the inner upright member. A volleyball is supported and positioned by an arm secured to a cam and cam follower assembly mounted on the upright member which provides instant feedback to the user if a correct hit or incorrect hit of the volleyball is made by allowing rotation of the arm if a correct hit is made, while limiting arm movement if an incorrect hit is made. An angle adjustment apparatus is secured to the upright support member and to the arm. The angle adjustment apparatus includes a positioning plate having angle markings thereon and an angle locating disk including a plurality of spaced detents for positioning and alignment of the disk with the angle marking on the positioning plate allowing control of the angle at which the arm and volleyball are positioned.

18 Claims, 5 Drawing Sheets



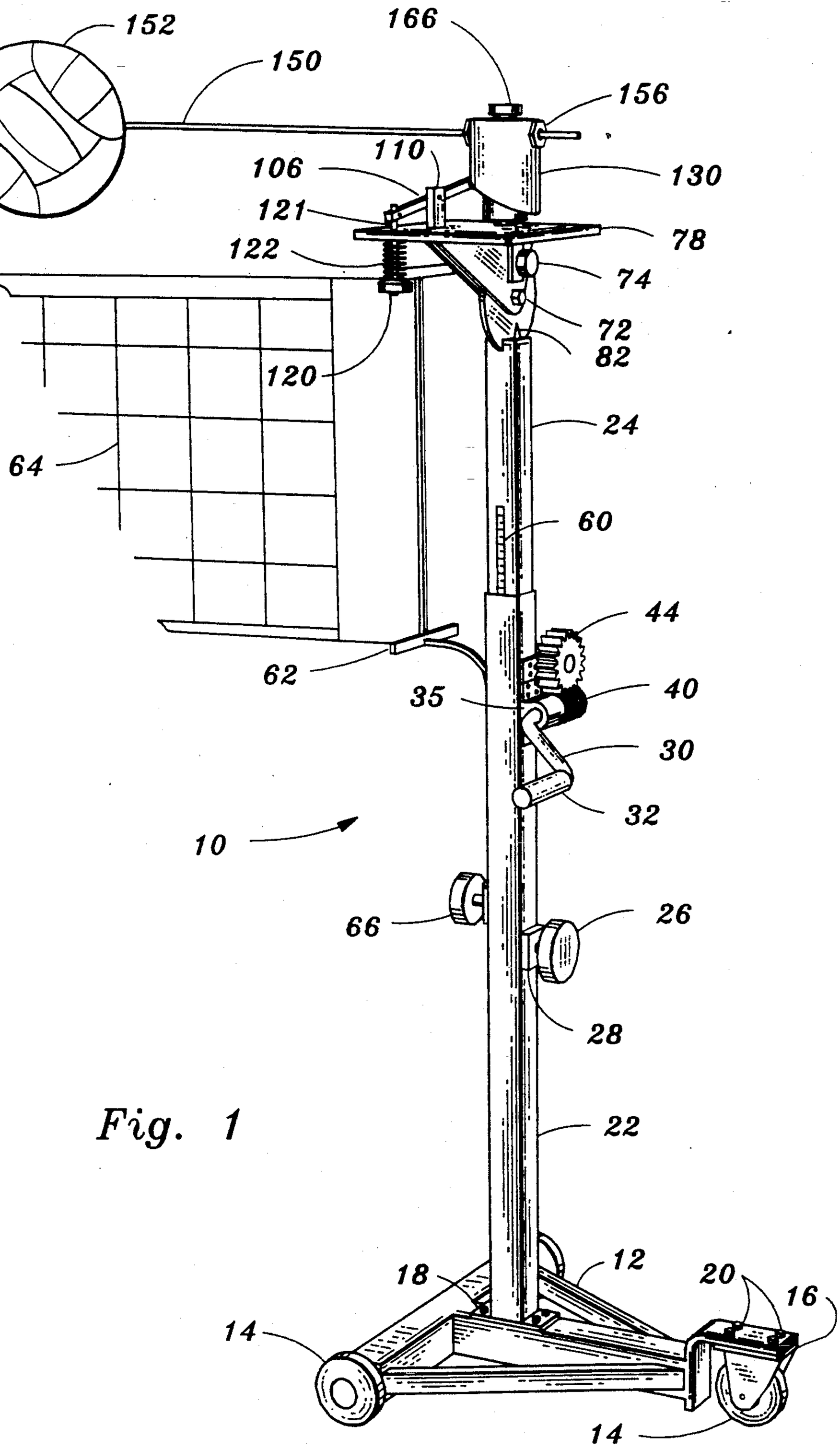

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Fig. 1

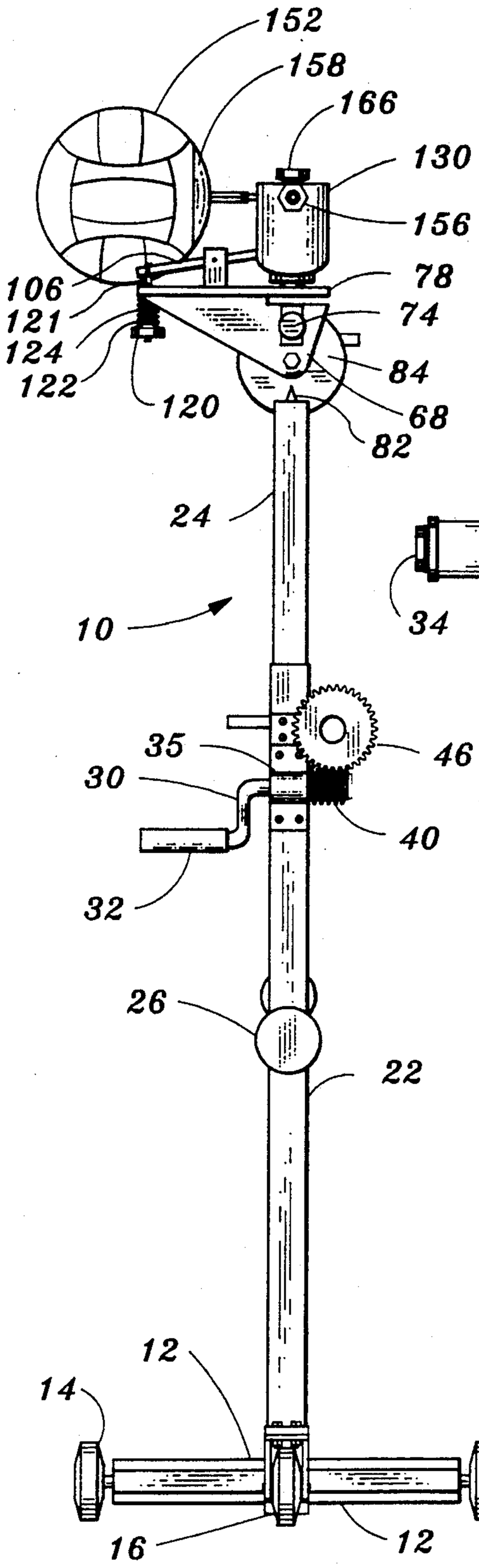

Fig. 2

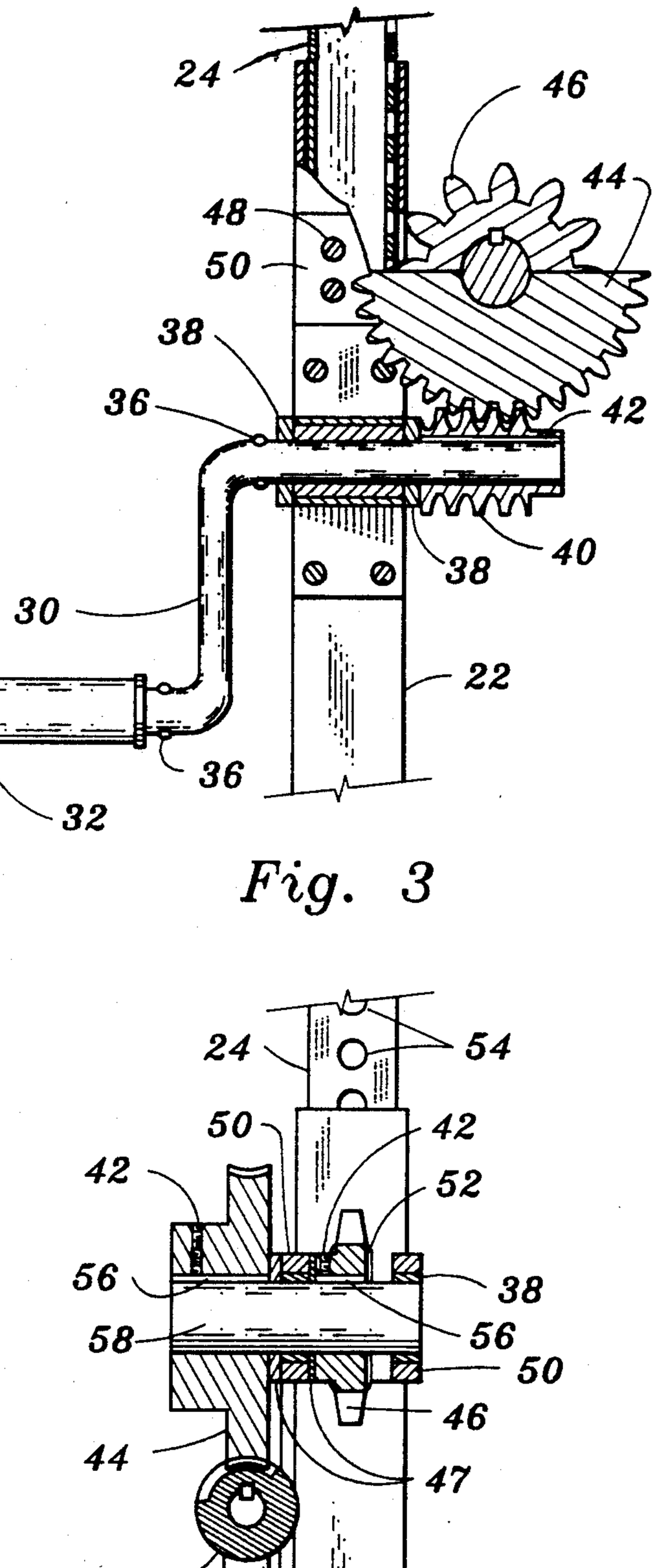

Fig. 3

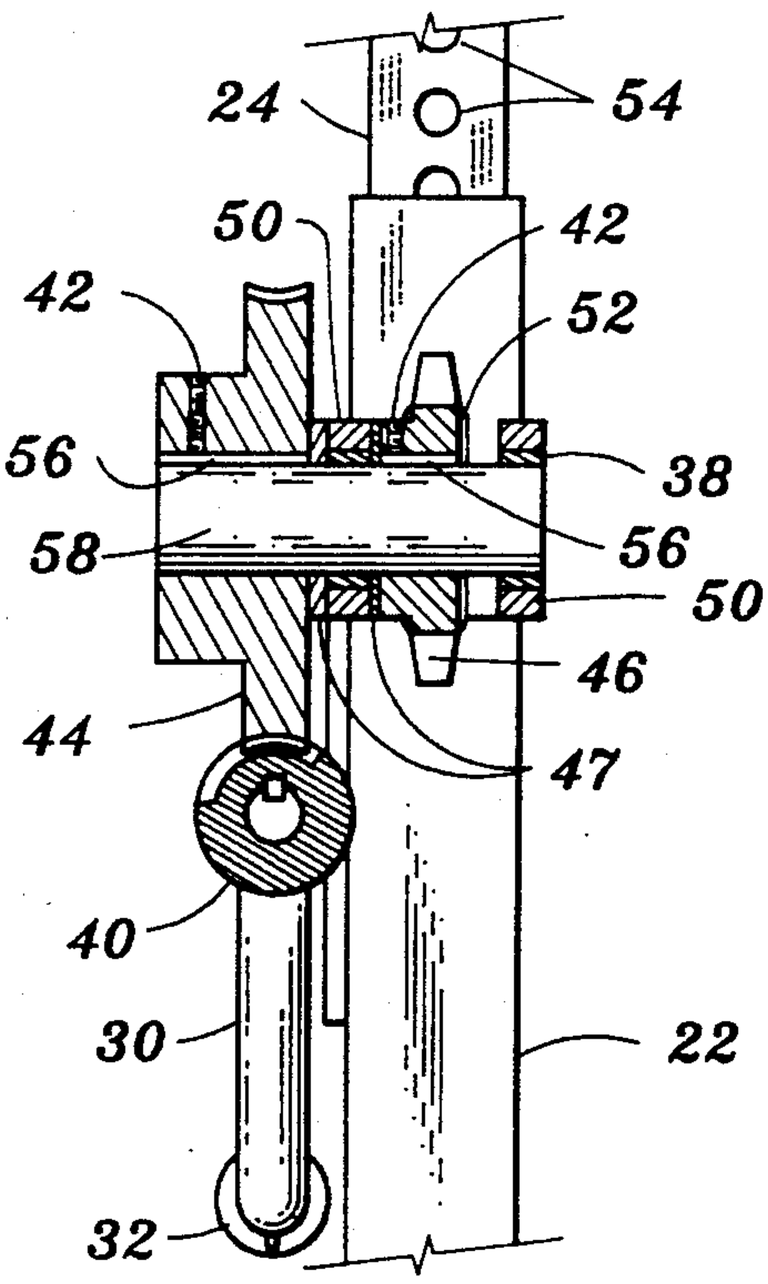

Fig. 4

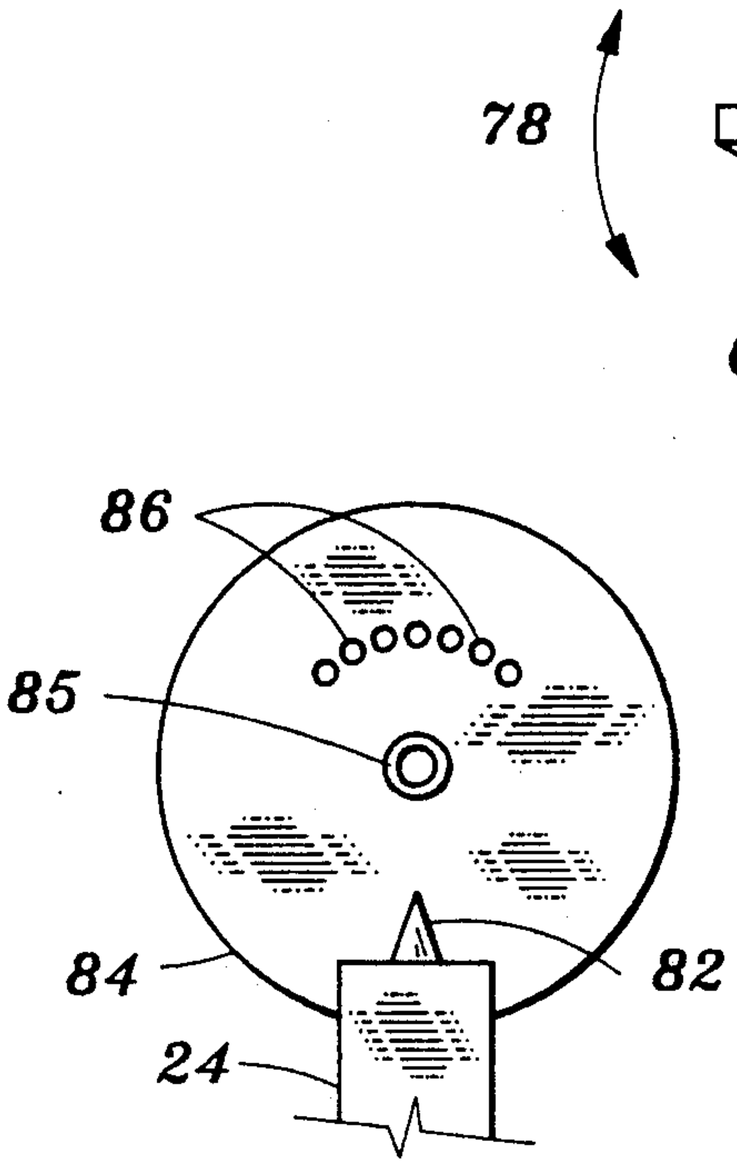

Fig. 5

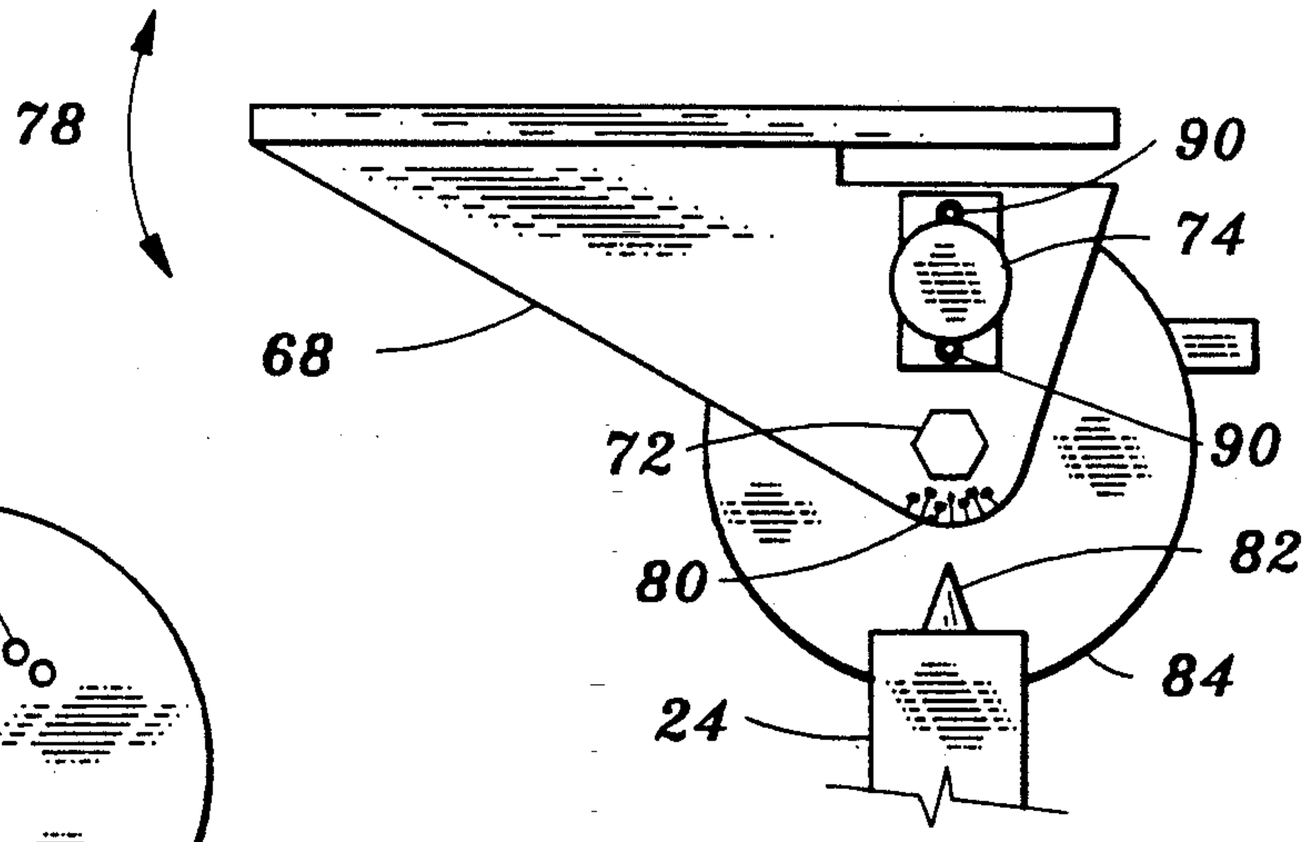

Fig. 6

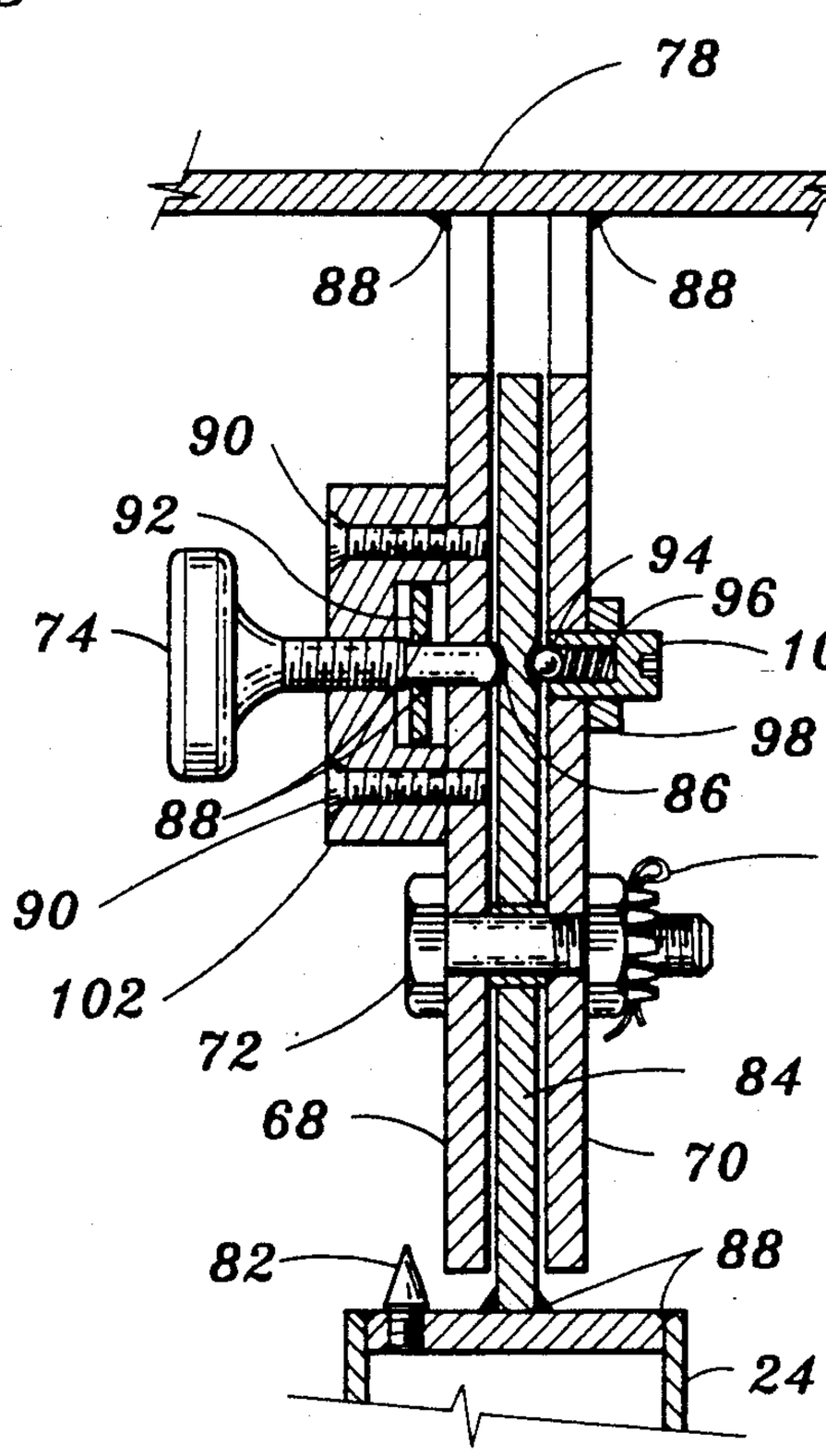

Fig. 7

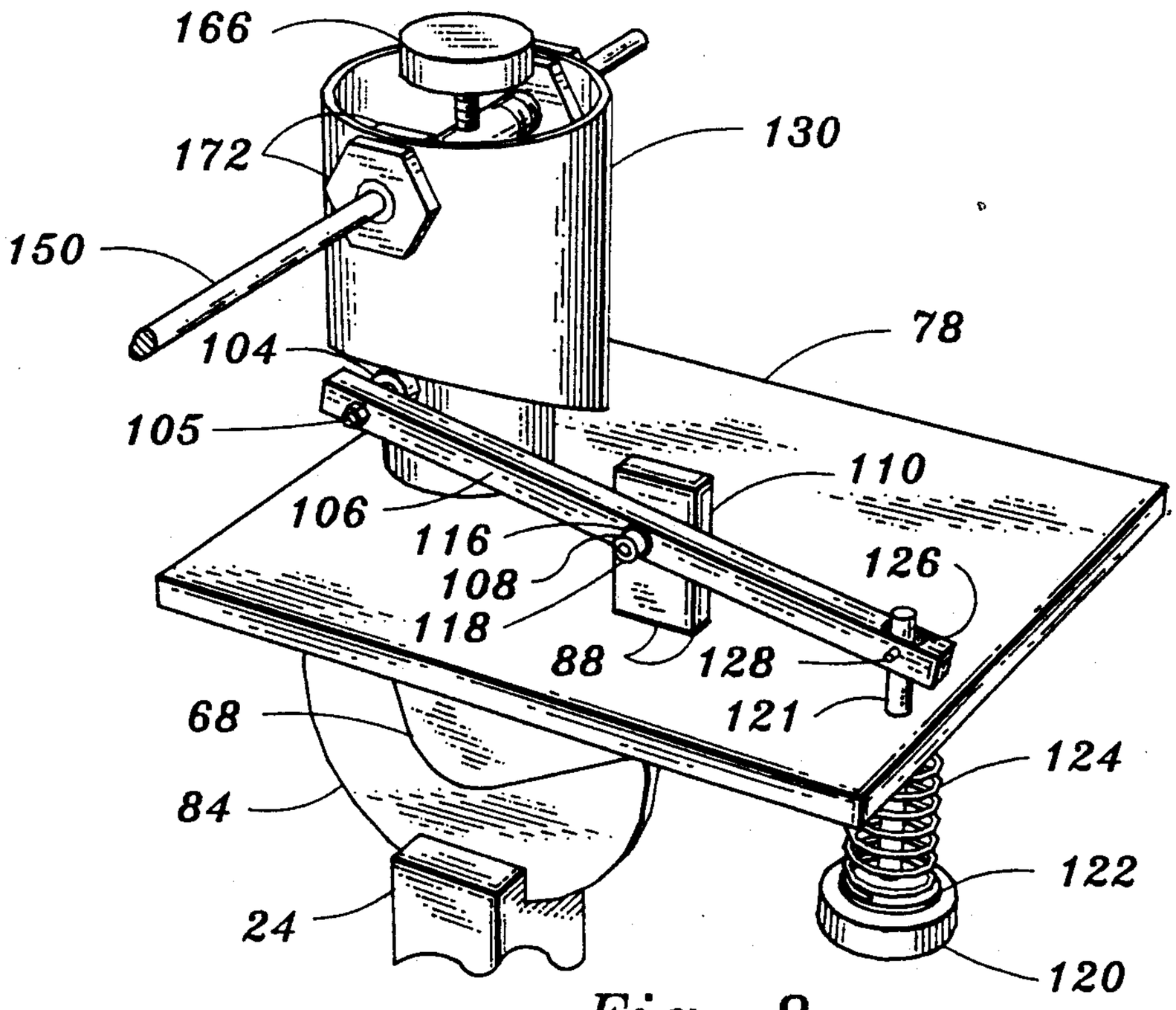
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Fig. 8

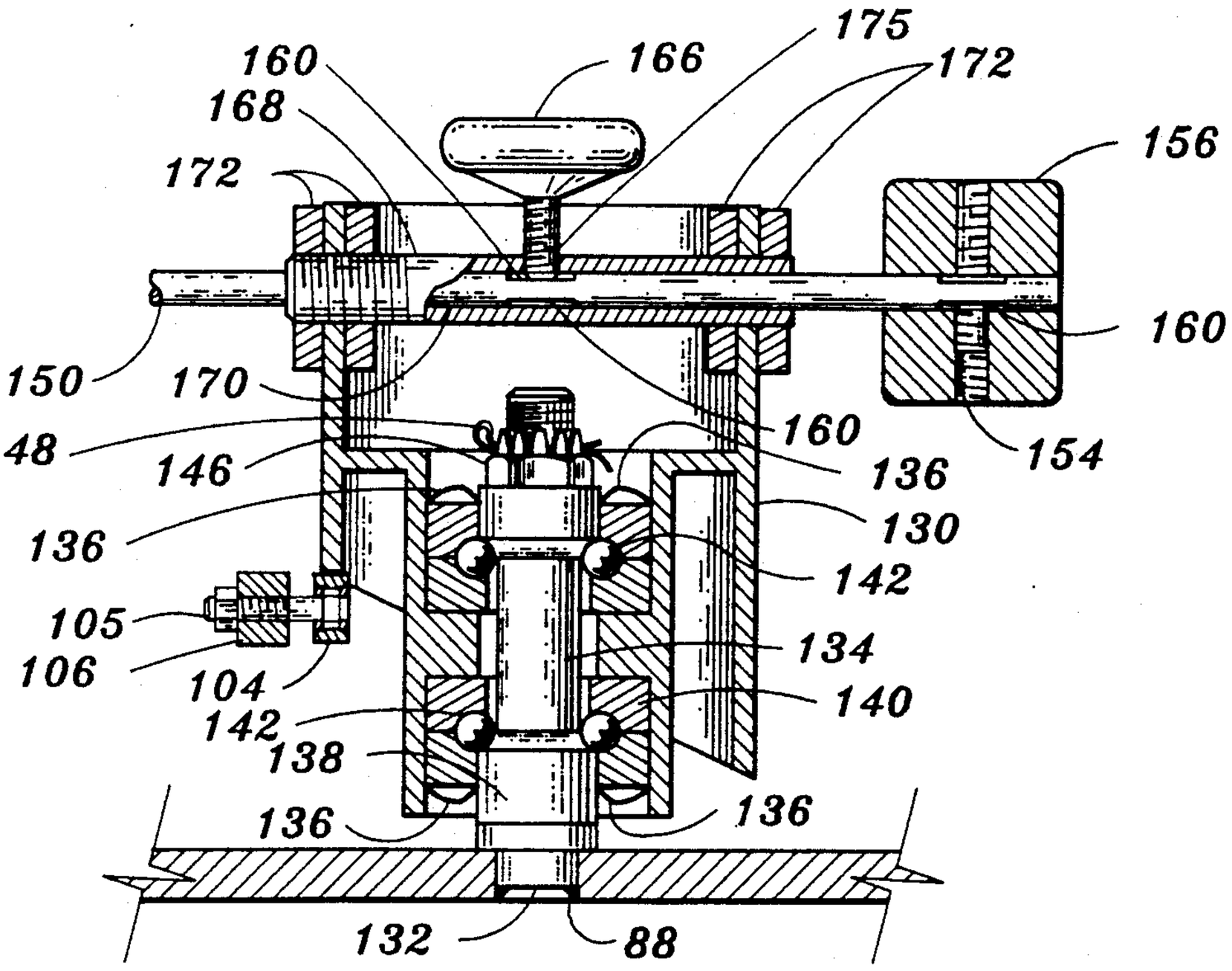
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Fig. 9

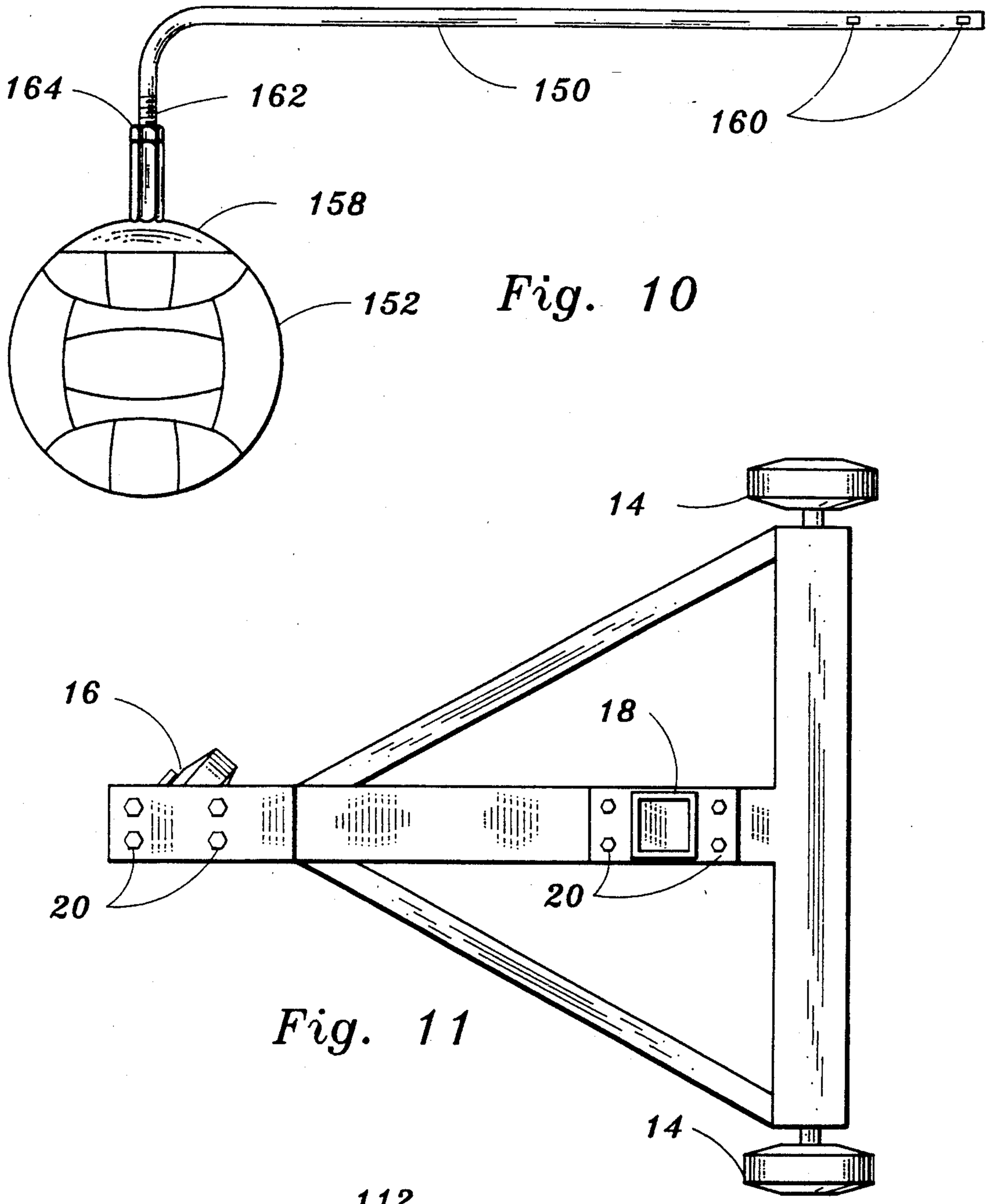

Fig. 10

Fig. 11

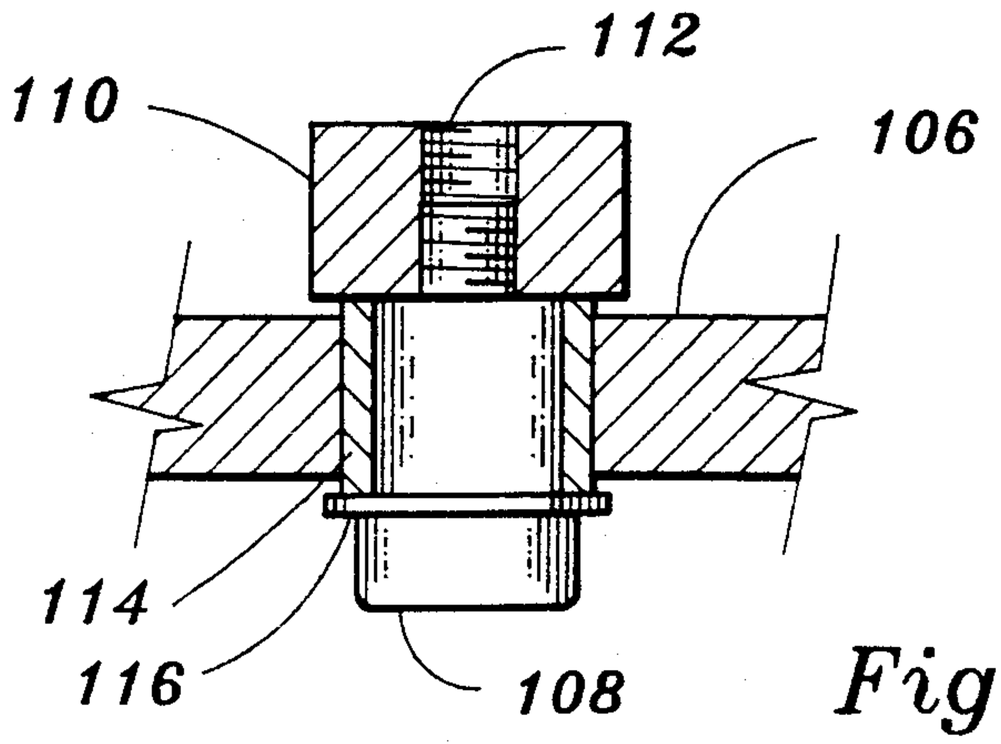

Fig. 12

VOLLEYBALL TRAINING AND MONITORING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates to sport practice apparatuses and systems, and more particularly to volleyball training and monitoring apparatuses.

2. Description of Prior Art

In recent years volleyball has experienced tremendous growth in popularity, both as a spectator and as a participant sport. Numerous practice devices have been proposed and implemented for developing and polishing skills such as spiking, serving, blocking, jumping, and the like. Unfortunately all are significantly limited in function and application.

In the sport of volleyball spike plays, accurate hitting of the volley ball, and correct jumping and positioning are perhaps the most important and difficult skills to learn and perfect. It is difficult to coach and teach the skills required in volleyball since the plays involve quick striking and spiking of the volleyball often completed in a jumping position off of the floor. To be effective, the coach must be extremely vigilant and observant of the player's foot work, arm and trunk motion, and of course, where the struck ball goes. Of great importance are jumping height and position of the player, the quality of hit, and hand and wrist orientation at ball impact. All of these observations are difficult, if not impossible to make on a consistent basis. Moreover, prior to the present invention there was no practice apparatus available which could be aligned anywhere on a volleyball court, or elsewhere, where height, angle, and tension adjustments could be made to simulate delivery of the ball to anywhere on the court, and indicate a correct hit by its action.

Various volleyball practice apparatuses have been proposed and implemented. For example, training apparatuses have been developed to support a game ball at a selected elevation for practice purposes. A typical volleyball training apparatus includes an upright post extending from a weighted base. A lateral arm extends outward from the post to a ball support. Such apparatuses provide no means to adjust the height and/or tension of the ball, nor do they provide any feedback to the user to indicate when a correct or an incorrect hit has been made.

A further problem with current ball supporting apparatus is that the ball, to be positioned at the jump height of the user, necessitates use of a stepladder or chair beside the ball support in order to position the ball, which of course, is both obstructive and distractive to the user. Variations of such devices include the use of a tethered ball. In such devices, a volleyball is tethered to a tether line which is secured to the support and is restricted in movement, after being hit, by the tether line. This provides a solution of sorts to the loading problem, but adds further problems in that tethers do not allow the ball to move along its natural flight path, provide no means for height, angle, or tension adjustments of the ball, nor provide any feedback information to the user regarding the quality of the hit, spike, serve, etc., being practiced. Moreover, the tether type device has a tendency to inhibit or obstruct a hit or stroke to the correct impact area of the ball, which may in fact

lead to diminished performance by the user of such devices.

Another genre of practice apparatus are the conventional ball setting apparatuses. Because the physical capabilities and height of individual players vary, the setting height of the ball for effective training must be easily and readily adjustable. Apparatuses which provide for such ready adjustments have not been previously available. Numerous forms of ineffective interlocking telescoping arrangements using set screw and the like have been utilized. While such apparatuses function adequately to select an operating height of the ball support, most are cumbersome and difficult to operate. Consequently, coaches and players often set such training devices at a preselected height thus requiring all players to practice at such height, which may have little or nothing to do with the height at which they need to practice.

Therefore, known apparatuses do not satisfactorily provide a volleyball practice means for practicing crucial aspects of the sport, such as spiking, serving, hitting, jumping, approach to the ball, and other crucial skills. Nor do known apparatuses provide for height, angle, or tension adjustments so as to simulate delivery of a volleyball to anywhere on the opposite side of the court, or have means to indicate a correct or incorrect hit by the apparatuses action.

Accordingly, it is a primary object of this invention to provide an improved volleyball training and monitoring apparatus designed so that it can be aligned anywhere on a court and including height, angle, and tensions adjustment means enabling the user to simulate delivery of a ball to anywhere on the opposite side of the court.

It is a further objective of the invention to provide a volleyball training and monitoring apparatus with means to indicate directly to the user whether a correct or an incorrect hit has been made.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by instrumentalities and combinations particularly pointed out in the appended claims.

SUMMARY OF THE INVENTION

To achieve the foregoing objects, and in accordance with the purposes of the invention as embodied and broadly described herein, a volleyball training and monitoring apparatus, comprising: a base, an upright support member connected to said base and extending upwardly from the base, said upright support member having an inner upright member slideably secured therein and extending upwardly therefrom; height adjustment means for said upright support member operably secured to the upright support member and to said inner upright member; means for supporting and positioning a volleyball, including arm means positioned in a generally horizontal orientation to the upright support member; means for controlling the position and movement of said volleyball comprising a cam and spring loaded follower means operably secured to the upright support member and to said arm means; and angle adjustment means for positioning and adjusting the arm means at a desired angle including positioning means and angle indicator means coupled thereto.

The means for controlling the position and movement of said volleyball preferably includes a compression spring means secured to a cam follower arm having a pivot mounted to a pivot block, said pivot block is secured to a plate means; said compression spring is springably engaged to adjustment knob means, allowing for control and monitoring of the volleyball movement and providing tension and torque control means for said arm means. Positioning means are preferably provided by a positioning plate having angle markings thereon and locking means for securing the positioning plate at a desired angle. Angle indicator means are preferably provided by a locating disk having a plurality of spaced detents thereon for positioning and alignment corresponding to said angle markings on said positioning plate; the locating disk is preferably secured between said positioning plate and a backing plate.

In accordance with the purposes of the invention, there is also provided a game ball support and training apparatus, comprising: a base; an upright support member connected to said base and having extension means for raising and lowering said upright support member; height adjustment means operably secured to the upright support member for height adjustments of the upright support member; means for supporting and positioning said game ball including an arm positioned in a substantially horizontal orientation to the upright support member; means for controlling the position and movement of the game ball including a cam and tension control means operably attached to the upright support member and to said arm, and angle adjustment means for locating and positioning the arm at a desired angle, whereby the game ball may be positioned to simulate delivery of the game ball to a desired location when correctly struck.

Height adjustment means preferably comprise a handle secured to a worm element, said worm element is operably coupled with worm gear housing having a sprocket operably mounted therein and engaged with said inner upright member. The means for supporting and positioning said game ball preferably comprise an arm being preferably flexible and having slots therein to maintain said arm in a parallel position within base plate means so that when the game ball is struck in a correct manner the impact imparts force perpendicular to said base plate thereby smoothly rotating said cam and said ball, indicating to the user a correct hit. Conversely, an incorrect hit results in the arm wobbling up and down slightly but not rotating smoothly, if at all, around said cam so the user instantly knows he or she has hit the ball incorrectly.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute part of the specification, illustrate a preferred embodiment of the invention and, together with a general description given above and the detailed description given below, serve to explain the principles of the invention.

FIG. **1** is a side view of an embodiment of a volleyball training and monitoring apparatus incorporating the teaching of the present invention.

FIG. **2** is a front view of such embodiment, according to the invention.

FIG. **3** is an exploded front view of a handle and height adjustment means of such apparatus, according to the invention.

FIG. **4** is an exploded side view of a handle and height adjustment means of such apparatus, according to the invention.

FIG. **5** is an exploded view of an angle locating disk of such apparatus, according to the invention.

FIG. **6** is an exploded view of an angle positioning plate of such apparatus, according to the invention.

FIG. **7** is an exploded sectional view of an angle adjustment means of such apparatus, according to the invention.

FIG. **8** is an exploded view of controlling and positioning means of such apparatus, according to the invention.

FIG. **9** is a sectional view of a cam and arm support of such apparatus, according to the invention.

FIG. **10** is an exploded top view of an arm and volleyball retaining means of such apparatus, according to the invention.

FIG. **11** is a top view of a base of such apparatus, according to the invention.

FIG. **12** is an exploded view of a pivot mounting block of a cam follower of such apparatus, according to the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the present preferred embodiments of the invention illustrated in the accompanying drawings.

In accordance with the present invention, there is provided a volleyball training and monitoring apparatus, comprising: a base; an upright support member connected to said base and extending upwardly from the base, said upright support member having an inner upright member slideably secured therein and extending upwardly therefrom; height adjustment means for said upright support member operably secured to the upright support member and to said inner upright member; means for supporting and positioning a volleyball, including arm means positioned in a generally horizontal orientation to the upright support member; means for controlling the position and movement of said volleyball comprising a cam and a spring loaded follower means operably secured to the upright support member and to said arm means; and, angle adjustment means for positioning and adjusting the arm means at a desired angle including positioning means and angle indicator means coupled thereto.

In FIG. **1**, the volleyball training and monitoring apparatus is shown as apparatus **10** having base **12**, wheels **14** rotatably mounted to base **12**, a pivoting locking wheel mechanism **16**, operably coupled thereto, and an upright flanged member **18** secured to base **12** by bolts **18** for detachably securing an upright support member **22** therein. The upright support member **22** is preferably composed of a durable, resilient material such as metal, plastic, composite, or the like, and has inner upright member **24** slideably secured therein and extending upwardly therefrom. Height adjustment means are provided for upright support **22** and inner upright member **24** by a handle driven sprocket **46** which engages with apertures **54** in inner upright member **24** and driven by a notched element or worm **40** operably engaged with a worm or notched gear **44** to prevent back slippage of sprocket **46**. A handle **30** is operably coupled with worm **40** and preferably has rotating grip **32** retained by snap ring keeper **34**, and handle housing **35**, best seen in FIG. **3**. By rotating

handle **30** worm **40** drives worm gear **42** and sprocket **46** which raises or lowers inner upright member **24** as desired. The handle and sprocket mechanism illustrated in FIGS. **1** to **4** may be replaced with other alternative mechanisms of raising or lowering apparatus **10**, such as a motor driven support member raising and lowering device, or other conventional mechanical means well known in the art.

Inner upright member **24** preferably includes a scale **60** for height indication of apparatus **10**, which in the preferred embodiment, is calibrated with the ball holding means so that the user has a direct and convenient reading of the height at which the ball is positioned. Upright support member **22** may have a net attachment, such as adjustable net **64** secured to upright member **22** by upright element **62** which is positioned and secured by knob fastener **66**. Net **64** may be set on either side of support member **22** to accommodate both left and right handed players, to alert the players to fouls at the net, and to accommodate different heights of individual players such as for boys and girls teams.

Referring specifically now to FIGS. **3** and **4** a detail of the preferred height adjustment means are illustrated in exaggerated fashion for clarity. In FIG. **3** handle **30** is preferably secured in upright support member **22** and bushing **38** is provided for thrust generated by action of worm **40**., which are preferably self-lubricating bushings, elevations **36**, set screws **42**, and screws **48**. The rotating grip **32** is also preferably secured in place by elevations or pinches **36** best seen in FIG. **3**. FIG. **4** shows an exaggerated sectional view of sprocket **46**, shaft **58**, bushing **38**, bracket **50**, key **56**, and clearance aperture **52** for sprocket **46**. The preferred combination of handle **30** driving worm **40**, worm gear **44**, sprocket **46**, and washer **47** provide a smooth, efficient, and safe mechanism for adjusting the height of apparatus **10**.

As shown in FIGS. **1** and **2**, and in greater detail in FIGS. **5** and **6**, angle adjustment means for adjusting the angle at which ball **158** is held are attached to inner upright support member **24** and comprise locating disk **84** preferably welded to inner upright member **24**, however, screws, bolts, and other conventional fastening means may also be used. Pointer **82** on member **24** indicates angles designated on angle markings **80** on positioning plate **68** thereby providing positioning means for apparatus **10**. Locating disk **84** is preferably secured to positioning plate **68** and to a backing plate **70** by bolt **72** and cotter pin **73**, but may be otherwise. Threaded knob **74** locks into detents **86** for positioning ball **152** at a desired angle, and is secured to the positioning plate by block **102**, screws **90**, washer **92**, and welds **88**, so as to secure knob **74** in position when adjusting the angle of positioning plate **68**. However, other conventional fastening means such as bolts, adhesives, rivets, or the like may alternatively be used. Positioning plate **68** and backing plate **70** are secured to cam support base plate **78** by welds **88**, however, bolts, screws, adhesives, or other fastening means maybe substituted therefore. In FIG. **5**, inner upright member **24** is shown with locating disk **84** having bushing **85**, preferably a self-lubricating bushing, and detents **86**. FIG. **6** shows an exploded view of positioning plate **68** for clarity, with angle indicator markings **80**, locating disk **84**, pointer **82**, and cam support base plate **78**.

Referring now to FIG. **7**, a sectional view of positioning plate **68**, backing plate **70**, knob **74** for locking detents at a desired angle is shown. A spring loaded ball assembly for securing and indexing positioning plate **68** and locating disk **84** at a desired angle comprises ball **94** operably coupled to spring **96**, and secured in housing **100**, which is preferably threaded to receive retaining lock nut **98**. Bolt **72**, preferably a pivot bolt, is tightened and secured with a cotter pin **73**, to prevent binding or loosening of bolt **72**. Spacer bushings are also shown in FIG. **7** around the shaft of bolt **72**.

As shown in FIG. **8**, means for controlling the position and movement, of ball **152** are provided, in the preferred embodiment, by a cam **130**, and a cam follower **104** secured to cam follower arm **106** by bolt **105**. Cam follower **105** preferably has a standard needle bearing on the stud and is sealed and pre-lubricated for smooth and efficient operation. Pivot **108** is secured to pivot block **110** having threaded aperture **112** and secured thereto by bolt **118** and includes, in the preferred embodiment, shoulder bolt pivot **108** and bushing **114**. Pivot block **110** is preferably welded to cam support plate **78**, however, other fastening means may also be utilized such as bolts, screws, rivets, and the like. Cam follower arm **106** is pivotally secured to shaft **121** with pin **128**. Adjustment knob **120**, washer **122**, and tension spring **124** provide tension adjustment means for apparatus **10**. A pivot pin **128** pivotally secures cam follower arm **106** to shaft **121**. Cam follower arm **106** preferably includes a slotted opening **126** for clearance of shaft **121**. In FIG. **12**, a detail of cam follower arm **106** at pivot **108** is illustrated. Pivot mounting block **110** has threads **112** and washer **116** for bolt **108**. Bushings **114** are preferably self-lubricating and of greater length than the thickness of cam follower arm **106**, and protrude slightly from both sides of arm **106** to prevent wear on the arm.

Cam **130** is secured on plate **78** and is operably coupled with cam follower arm **106** and ball support arm **150** providing both positioning and control means for ball **152** secured to support arm **150**. Best seen in FIG. **9** is the linkage of ball support arm **150** cam **130**, support plate **78**, and slots **160** in arm **150**. The positioning and support means provided by cam **130**, cam follower arm **106**, and ball support arm **150**, are preferably adjusted so that when a user strikes ball **152** in a correct fashion, ball support arm rotates about spindle **134** smoothly, while an incorrect hit produces an attenuated, wobbly movement of arm support **150**, immediately indicating to the user that the ball has been incorrectly hit. What is a correct hit is determined by the settings of positioning plate **68**, locating disc **84** and the setting of support arm **150** in cam **130**, and of course, may be varied to correspond to the purpose and training requirements of the user. To accomplish this, ball support arm **150** is secured in cam **130** by knob **166** which is preferably engaged in slots **160** in arm **150** as shown in FIG. **9**. Slots **160** and knob **166** function to keep ball support arm parallel to base plate **78** so a correct hit will impact perpendicular to plate **78** resulting in a smooth rotation of the cam. Spindle **134** is secured to plate **78** by plug **132** which is preferably welded thereto, however, other conventional fastening means may be used as well, such as bolts, screws, rivets, and the like. Seal **136** is secured to inner race **138** and spindle bearings **142** are preferably secured to spindle **134** and to outer race **140**. Spindle **134** is preferably secured by nut **146** with cotter pin **148** to pre-load bearings **142**. Counterweight **156** may be used in conjunction with the spring tension on cam **130** to allow cam rotation by users with less physical strength, and is secured to ball support arm **150** by screws, but may be otherwise secured. Support bushing

168 is shown secured by nut 172, and with knob 166 tightening and securing ball support arm 150 in a parallel orientation to base plate 78 allowing rotation of arm 150 as a result of striking ball 152 parallel to base plate 78 which is angularly adjusted by positioning plate 68 and locating disk 84.

Referring now to FIG. 10, preferred means for supporting and positioning ball 152 comprise flexible ball support arm 150 with slots 160 for coupling with cam 130, and ball support cup 158 for securing and positioning ball 152 on arm 150. In the preferred embodiment arm 150 is threaded with threads 162 to attach locking nut 164 for securing and positioning ball support cup 158. Cup 158 is preferably composed of a durable, flexible material such as rubber or thermoplastics. In FIG. 10, ball support cup 158 is configured to hold a volleyball therein, however, if apparatus 10 is used for other sports, with a differently configured game ball, alternative configurations of cup 158 would be used. Slots 160 are preferably flat and positioned 180 degrees from each other as shown in FIGS. 9 and 10 allowing for rotating arm 150 of apparatus 10 for use by either left or right handed players. In the preferred embodiment as illustrated in FIG. 10 ball support arm 150 is shown with a 90 degree bend on the ball retaining end thereof.

As shown in FIG. 11, base 12 has wheels 14 rotatably attached thereto for facilitating movement of apparatus 10. A pivoting and locking wheel 16 is preferably provided to aid in alignment of apparatus on a playing court and to prevent unwanted movement of apparatus 10 while in use. Flange 18 is shown attached by bolts 20, however, other conventional fastening means may be substituted without departing from the spirit of the invention.

In operation and use volleyball training and monitoring apparatus 10 is extremely efficient for learning the correct approach to the ball and the correct position of the body and arm at impact with the ball from any position on a court. Apparatus 10 may be used anywhere on a volleyball court to simulate delivery of a ball to anywhere on the opposite side of the court while indicating immediately to the user whether a correct or an incorrect hit has been made. Moreover, the concept embraced by the present invention and illustrated in the embodiments described is applicable to other sports as well as volleyball, such as tennis, soccer, water polo or other ball oriented sports with appropriate modifications of apparatus 10. In use, a ball, such as volleyball 152, is placed in ball support cup 158 on ball support arm 150. The height of ball 152 is then set by cranking handle 30, either to raise or lower inner upright support 24 and thereby ball 152. The angle at which the user desires to set ball 152 and arm 150 is set by means of knob 74 securing positioning plate 68 and locating disk 84 at a desired angle utilizing angle indicator markings 80 and pointer 82. The angle of cam support plate 78 is thereby altered which in turn determines the angularity of arm 150 and cam 130. The tension at which ball support arm 150 is held is adjusted by knob 120 to accommodate players of varying strengths and abilities. Apparatus 10 is then moved to a desired location on the court for training, practice, and monitoring. When the user strikes ball 152 perpendicular to base plate 78, that is the angle set by positioning plate 68 and locating disk 84, arm 150 and ball 152 will rotate smoothly around cam 130. However, if the ball is struck at an incorrect angle, that is, not perpendicular to base plate 78 and the angle set by locating disk 84 and positioning plate 68, arm 150 and ball 152 merely wobble up and down slightly but cannot rotate smoothly about cam 130. In this manner, the player or coach is instantly appraised of whether a correct or incorrect hit has been made. Further, since arm 150 is preferably flexible as is ball support cup 158, improper hits of ball 152 are emphasized and clearly apparent to the user. By adjusting the height of ball 152 correct jumping and positioning is learned with apparatus 10 and by adjusting the tension at which arm 150 is held power and strength conditioning means are also provided.

While the above description contains many specificities, they should not be construed as limitations on the scope of the invention, but merely as exemplifications of preferred embodiments thereof. Additional advantages and modifications will readily occur to those skilled in the art. The invention in its broader aspects is, therefore, not limited to the specific details, representative apparatus and illustrative examples shown and described. Accordingly, departures may be made from such details without departing from the spirit or scope of the applicant's general inventive concept.

What is claimed is:

1. A volleyball training and monitoring apparatus, comprising:

a base,

an upright support member connected to said base and extending upwardly from the base, said upright support member having an inner upright member slideably secured therein and extending upwardly therefrom,

height adjustment means for said upright support member operably secured to the upright support member and to said inner upright member,

means for supporting and positioning a volleyball, including arm means positioned in a generally horizontal orientation to the upright support member,

means for controlling the position and movement of said volleyball comprising a cam and a spring loaded follower means operably secured to the upright support member, and to said arm means, and

angle adjustment means for positioning and adjusting the arm means at a desired angle including positioning means and angle indicator means coupled thereto.

2. The volleyball training and monitoring apparatus of claim 1 wherein said means for adjusting the height of said upright support member comprises a handle secured to a notched element, said notched element is operably engaged with a gear, said gear being operably coupled with a sprocket engaged with said inner upright member.

3. The volleyball training and monitoring apparatus of claim 2 wherein said inner upright support member includes a plurality of apertures for operable engagement of said sprocket for adjusting the height of said upright support member.

4. The volleyball training and monitoring apparatus of claim 2 wherein said handle comprises a swivel handle.

5. The volleyball training and monitoring apparatus of claim 1 wherein said arm means comprises a flexible slotted arm having a volleyball retaining means secured at a terminal end thereof.

6. The volleyball training and monitoring apparatus of claim 5 wherein said means for controlling the position and movement of said volleyball further includes a

compression spring means secured to a cam follower arm having a pivot mounted to a pivot block, said pivot block is secured to a plate means; said tension spring is springably engaged to adjustment knob means, allowing for control and monitoring of the volleyball movement and providing tension control means for said arm.

7. The volleyball training and monitoring apparatus of claim 1 wherein said positioning means comprises a positioning plate having angle markings thereon and locking means for securing said positioning plate at a desired angle.

8. The volleyball training and monitoring apparatus of claim 7 wherein said angle indicator means comprises a locating disk having a plurality of spaced detents thereon for positioning and alignment corresponding to said angle markings of said positioning plate, said locating disc is secured between said positioning plate and a backing plate.

9. The volleyball training and monitoring apparatus of claim 1 further including and adjustable net mounting means detachably secured to said upright support member, for operably securing a volleyball net to the upright support member.

10. A game ball support and training apparatus, comprising:

a base,

an upright support member connected to said base and having extension means for raising and lowering said upright support member,

height adjustment means operably secured to the upright support member for height adjustments of the upright support member,

means for supporting and positioning said game ball including an arm positioned in a substantially horizontal orientation to the upright support member,

means for controlling the position and movement of the game ball including a cam and tension control means operably attached to the upright support member and to said arm, and

angle adjustment means for locating and positioning the arm at a desired angle, whereby the game ball may be positioned to simulate delivery of the game ball to a desired location.

11. The game ball support and training apparatus of claim 10 wherein said base comprises a triangulated frame having wheel means rotatably mounted thereon and a locking pivot wheel allowing for alignment on a game court or field.

12. The game ball support and training apparatus of claim 10 wherein said extension means comprises an inner upright member slideably secured within said upright support member.

13. The game ball support and training apparatus of claim 10 wherein said height adjustment means comprises a handle secured to a worm element, said worm element is operably coupled with a worm gear housing a sprocket engaged with said inner upright member.

14. The game ball support and training apparatus of claim 10 wherein said means for supporting and positioning said game ball comprises a flexible arm having slots therein to maintain said arm parallel to base plate means so that when the game ball is struck in a correct manner the impact imparts force perpendicular to said base plate rotating said cam.

15. The game ball support and training apparatus of claim 10 wherein said means for controlling the position and the movement of said game ball further includes a spring loaded follower means coupled to said cam; said spring loaded follower means are pivotally mounted to a pivot block and to adjustment knob means.

16. The game ball support and training apparatus of claim 10 wherein said angle adjustment means include a positioning means and angle indicator means.

17. The game ball support and training apparatus of claim 16 wherein said positioning means comprise a positioning plate having angel markings thereon and locking means for securing said positioning plate at a desired angle.

18. The game ball support and training apparatus of claim 16 wherein said angle indicator means comprise a locating disk having a plurality of spaced detents therein for positioning and alignment, said plurality of spaced detents positioned so as to correspond to said markings on said positioning plate.

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